

CRETACEOUS FAUNAS FROM ZULULAND AND NATAL,  
SOUTH AFRICA

A *FLICKIA* FROM THE CENOMANIAN OF NORTHERN ZULULAND

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(With 2 figures)

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ABSTRACT

The Lower Cenomanian Mzinene Formation of the Ndumu area of northern Zululand has yielded specimens of the peculiar cryptogenic dwarf ammonite *Flickia* Pervinquière, 1907 –type genus of the Family Flickiidae Pervinquière, 1910, a group characterized by simplified, goniatitic sutures. The family was previously known almost exclusively from pyritic clay facies, and the present occurrences in a nearshore clastic sequence is unusual. The specimens are referred to *Flickia quadrata* Collignon, 1964, a species previously known only from Madagascar. They represent the first record of the family from Africa south of the Sahara.

CONTENTS

	PAGE
Introduction . . . . .	211
Systematic palaeontology . . . . .	212
Discussion . . . . .	216
Acknowledgements . . . . .	217
References . . . . .	217

INTRODUCTION

In 1907 Pervinquière introduced the new genus and species *Flickia simplex* for a group of diminutive (5–15 mm diameter) moderately evolute compressed, smooth ammonites with narrowly arched venters and extraordinarily goniatite-like sutures. Pervinquière compared his specimens with the Triassic ceratites *Nannites* Mojsisovics, 1881, and *Lecanites* Mojsisovics, 1882, as well as considering that they might perhaps be juveniles of *Neolobites* Fisher, 1882, a view which he rejected on the basis of fundamental differences in sutures and shell form. He did, however, regard *Flickia* as a close ally within the ‘Hoplités’.

Thirteen years later, W. S. Adkins, working on the pyritic ammonite faunas of similar clay facies occurring in Texas (Adkins 1920) described two further species, *Flickia boesi* Adkins (Adkins 1920: 85, pl. 1 (figs 1–3)) and *Flickia? bosquensis* Adkins (Adkins 1920: 87, pl. 1 (fig. 4)). The latter, with

prominent umbilical bullae, Adkins believed to represent a new genus, subsequently named *Adkinsia* by Emile Böse, with *Adkinsia adkinsi* as type species (Böse 1928: 237, pl. 8 (figs 3–14)). Böse named three other species of *Adkinsia* in the same publication, all from the same horizon (the Del Rio Clay), all, however, probably being no more than intraspecific variants (*A. sparcicosta* Böse, 1928: 238, pl. 8 (figs 15–20); *A. tuberculata* Böse, 1928: 240, pl. 87 (figs 21–26) and *A. semiplicata* Böse, 1928: 246, pl. 9 (figs 7–12)). In the same year Adkins (1928) introduced the Family Flickiidae (as Flickidae) to accommodate these two genera, without commenting on their affinities.

With Collignon's (1928 onwards) monographic studies of the ammonite faunas of Madagascar, further examples of these curious genera were described, again as minute individuals in pyritic clay facies (*Flickia pervinquieri* Collignon, 1928: 4, pl. 2 (figs 15, 15a); *Flickia costellata* Collignon, 1964: 23, pl. 322 (fig. 1427) and *Flickia quadrata* Collignon, 1964: 23, pl. 322 (figs 1428–1429)).

The group thus show a strong facies-linked distribution, but unlike some other pyritic micromorphs from clay facies which have proved to be no more than nuclei of large limestone individuals (e.g. many *Submantelliceras* Spath, 1923 and *Neopulchellia* Collignon, 1929; see Casey (1965) and Kennedy & Hancock (1971, 1977) for discussions) they appear to be genuine micromorph inhabitants of offshore clay depositing environments.

The present Zululand specimens, from lignitic nearshore siltstone sequences, are thus a unique occurrence which extend both facies and geographic ranges of these curious ammonites, as well as providing the first adult individuals to be described which retain all of the body chamber and the aperture.

## SYSTEMATIC PALAEOLOGY

### Phylum MOLLUSCA

Class CEPHALOPODA Cuvier, 1797

Subclass AMMONOIDEA Zittel, 1884

Order AMMONITIDA Hyatt, 1889

Superfamily ACANTHOCERATAEAE Hyatt, 1900

Family Flickiidae Adkins, 1928

Genus *Flickia* Pervinquier, 1907

#### *Type species*

*Flickia simplex* Pervinquier, 1907 by original designation.

*Flickia quadrata* Collignon, 1964

Figs 1–2

*Flickia quadrata* Collignon, 1964: 23, pl. 322 (figs 1428–1429).

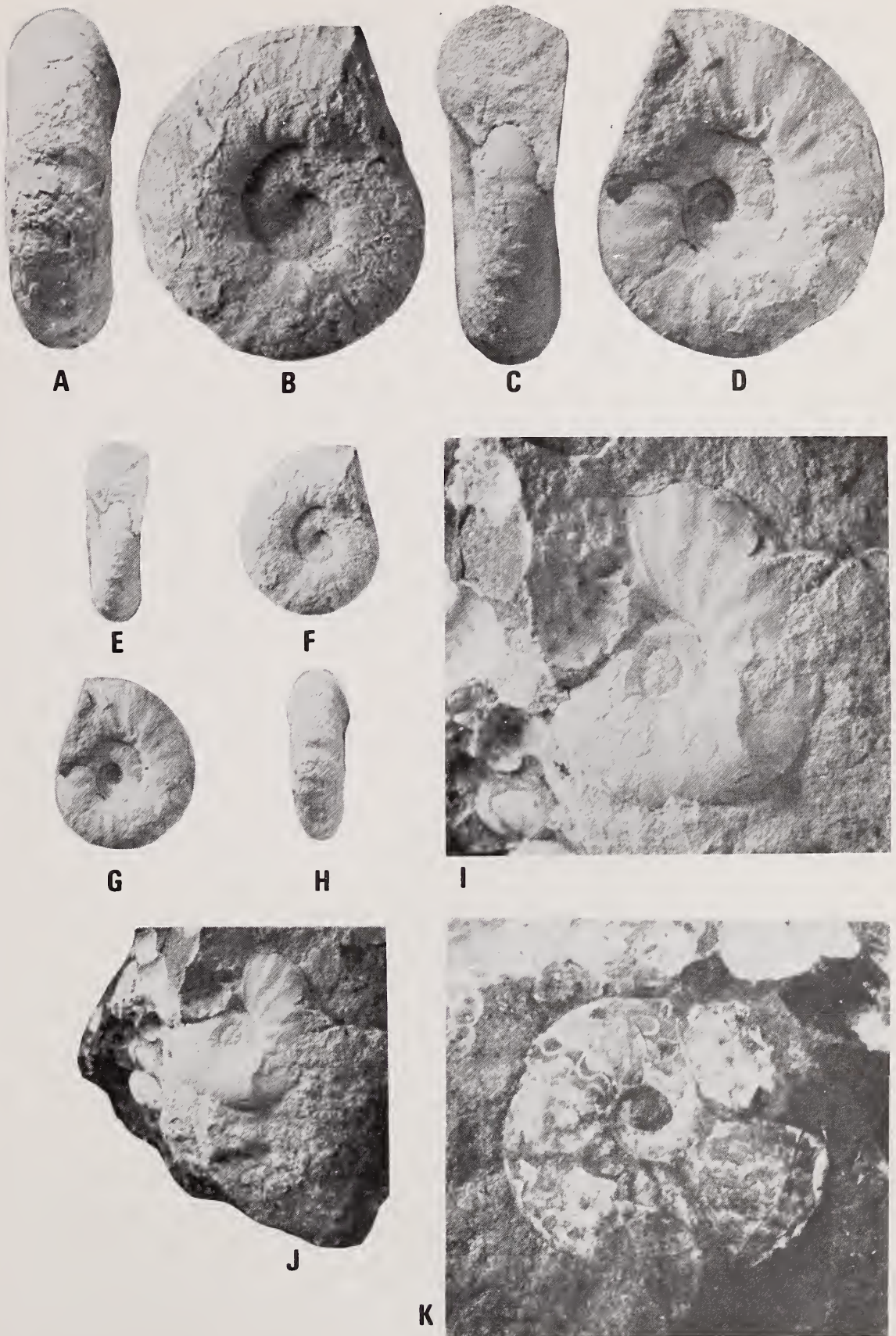


Fig. 1. *Flickia quadrata* Collignon. A-H. BMNH C79976. I-K. BMNH C79841. Both from the Mzinene Formation, Cenomanian I, Locality 181 of Kennedy & Klinger (1975).

A-D, I, K  $\times 2$ ; E-H, J  $\times 1$ .

*Holotype*

The specimen figured by Collignon (1964, pl. 322 (fig. 1428)), from the Lower Cenomanian of Beraketa sur Sakondry (Manera), Madagascar.

*Material*

Two specimens, BMNH C79841 and BMNH C79976, both from Locality 181 of Kennedy & Klinger (1975: 304), the Mzinene Formation exposed in hill slopes east of the road, 1 km south-east of the store at Ndumu, northern Zululand, 26°55'51"S 32°18'29"E. C79841 is from Bed 5 and C79976 from Bed 3 of this section (Kennedy & Klinger 1975, fig. 12, inset) and are of basal Cenomanian age (Cenomanian I).

*Dimensions*

All dimensions are in millimetres.

D = diameter, Wb = whorl breadth, Wh = whorl height, U = umbilicus.

Figures in parentheses are dimensions expressed as a percentage of over-all diameter.

	<i>D</i>	<i>Wb</i>	<i>Wh</i>	<i>Wb:Wh</i>	<i>U</i>
BMNH C79976	23,8(100)	8,2(34)	7,5(32)	1,09	7,8(33)
	18,7(100)	6,7(36)	6,3(34)	1,06	6,5(35)

*Diagnosis*

A slightly depressed to slightly compressed *Flickia* ornamented by low, broad irregular prorsiradiate fold-like ribs separated by variably developed constrictions, the shell surface being covered in coarse striae.

*Description*

Both specimens are adult and retain complete body chambers extending for between half and two-thirds of the last whorl. They are preserved as internal moulds, with traces of the original nacreous aragonitic shell present.

Coiling is evolute with a shallow, fairly wide umbilicus which comprises 33–35 per cent of the diameter. The whorls expand rather slowly, and are slightly compressed on the inner whorls, becoming slightly depressed on the outer. The greatest breadth is a little below mid-flank; the umbilical wall is low, the shoulder rounded, inner flanks somewhat flattened and subparallel (Fig. 2A), outer flanks convergent with an arched, rounded venter.

Ornament consists of rather irregular, low, broad, prorsiradiate fold-like ribs, which are narrow at the umbilical shoulder but widen across the flanks to pass across the venter as a broad, rounded swelling. The interspaces are of irregular width and depth, and some are accentuated into distinct constrictions. The shell surface (where preserved) of both ribs, interspaces and constrictions is covered by well-developed striae (Fig. 1D, G); ribs, striae and constrictions all strengthen on the body chamber. The aperture (Fig. 1D) is simple, entire,

slightly flared in BMNH C79976, and preceded by a narrow rib in BMNH C79841 (Fig. 1I).

Both specimens show the sutures (Figs 1K, 2B), which are very simple and of basic Flickiid type, with entire lobes and saddles. There is a small median element to the external lobe E, a rather narrow lateral lobe L, and a shallow, broad  $U_2$ . Saddle E/L is the largest, and has a flattened top; L/ $U_2$  is smaller and rounded. In both specimens, the last few sutures crowd, indicating the specimens to be adult.

#### *Comparisons with other species*

*Flickia simplex* (Pervinquierè 1907: 214, pl. 9 (figs 2a–b, 3a–b, 4, 5a–b); Collignon 1928–9: 28, pl. 2 (figs 14, 14a); Collignon 1964: 23, pl. 322 (fig. 1425) is a much more compressed species during middle, and presumably later growth. It is ornamented only by fine, falciform striae.

*Flickia pervinquieri* (lectotype here designated is the original of Collignon 1929, pl. 2 (figs 15, 15a); see also Collignon 1931: 76, pl. 3 (figs 21, 21a); Collignon 1964, pl. 322 (fig. 1426)) is also flat-sided and compressed, completely smooth and, according to Collignon (1929), distinctly carinate. In his original description of this species Collignon also referred the original of Pervinquierè's (1907) plate 9 (fig. 5) to *Flickia pervinquieri*. This specimen is, in fact, the holotype of *Flickia simplex*, being so designated by Pervinquierè in his explanation of the plate.

*Flickia costellata* Collignon (1964: 23, pl. 322 (fig. 1427)), is also rather compressed but resembles *Flickia quadrata* in being ribbed, although these ribs are simple, blunt and narrow rather than broad folds with associated constrictions.

All described *Adkinsia* species bear strong umbilical bullae, whilst *Fischeuria* Pervinquierè, 1910 are very involute, globose and smooth when young with an

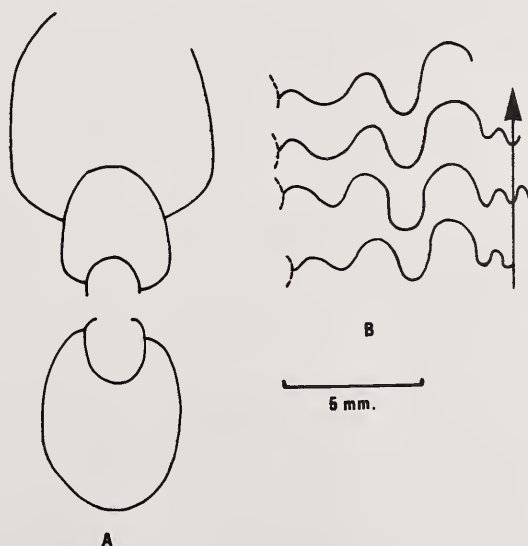


Fig. 2. *Flickia quadrata* Collignon. A whorl section and B suture of BMNH C79841.

angular umbilical shoulder. At least one species, *Fischeuria pusilla* Matsumoto & Inoma (1975: 290, pl. 42 (figs 4–5)), develops folds and constrictions on the body chamber.

Representatives of neither of these genera are liable to be confused with *Flickia*.

#### Occurrence

Low Lower Cenomanian of Madagascar and the Ndumu area, Zululand.

### DISCUSSION

*Flickia* was first described from north Africa, where Pervinquièrre (1907) stated the same specimens to be of both 'Vraconien' (e.g. Upper Albian) and 'Céno-manien' age in his description. *Flickia quadrata* was originally described from Collignon's Zone of *Mantelliceras martimpreyi* (auctorum, non Coquand) (*vide* Kennedy & Hancock 1971) at his locality 478, Beraketa sur Sakondry (Manera), Madagascar.

From the same locality Collignon (1964) recorded a large fauna, all as minute pyritic individuals, including many heteromorphs and the following normally coiled ammonites: *Desmoceras latidorsatum* (Michelin), *D. lemoinei* Collignon, *Protokossmaticeras madagascariense* Collignon, *Forbesiceras largilliertianum* (d'Orbigny), 'Neopulchella' *gignouxii* Collignon, *Euhystriocheras* (*Sakondryella*) *madagascariense* Collignon, *Prionocycloides proratus* (Coquand), *P. besairiei* Collignon, *Flickia simplex* Pervinquièrre, *F. pervinquierrei* Collignon, *Neosaynoceras gazellae* Pervinquièrre, *Mantelliceras aumalense* (Coquand), *M. mantelli* (J. Sowerby), *M. tuberculatum* (Mantell), *M. suzannae* (Pervinquièrre), *M. decaryi* Collignon and *Acompsoceras waterloti* Collignon.

This fauna is that which is well known elsewhere in Madagascar and also north Africa, where it is variously referred to the 'martimpreyi' Zone or *Submantelliceras aumalense* Subzone, whilst the closest North American faunas are approximately those of the *Graysonites adkinsi* Zone.

The presence in South Africa of one of the taxa apparently restricted to this level in clay facies elsewhere is thus of interest, as it allows correlation with a facies where there are large ammonites. This is important in deciphering the still poorly understood relationship between pyritic micromorph faunas and those of limestone and sandstone facies in Europe, India and elsewhere, where pyritic micromorphs are either absent or unrecognized as nuclei of much bigger specimens (Kennedy & Hancock 1971, 1977).

Bed 1 at locality 181 near Ndumu, concretions 1.6 m below the first specimen of *Flickia quadrata*, yielded abundant heteromorphs, especially *Hamites* and *Anisoceras* of the *A. pseudoelegans* Pictet & Campiche–*A. campichei* Spath group, indicative of the Upper Albian *Stoliczkaia dispar* Zone. Bed 2, which yielded a single *F. quadrata*, contained abundant *Sharpeiceras*, including specimens resembling *S. falloti* (Collignon), *S. florencae* Spath and *S. vohipalense*

Collignon, rare *Utaturiceras vicinale* (Stoliczka), submantellicerine nuclei, and *Mariella* (*Mariella*) *oehlerti* (Pervinquière) and varieties, and *Ostlingoceras* (*Ostlingoceras*) spp. Bed 3, a little higher still, yielded a further *Flickia*, and is crowded with the same *M.* (*Mariella*) and *O.* (*Ostlingoceras*). Some tens of metres higher in the section, a more diverse fauna with *Forbesiceras*, *Mantelliceras* and *Hypoturrilites* appears.

These observations provide a basis for correlation of pyritic and limestone faunas at the base of the Cenomanian in the area, and suggest that *Flickia* comes from what is virtually the base of the Cenomanian. Sadly, the associated Zululand faunas are still insufficient to tell whether or not these levels are absent in Europe or simply represented in a different biofacies (Kennedy & Hancock 1977).

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